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Controlling and Monitoring of Farm using Smart Technology

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Abstract - Agriculture is one of the main needs for human to stay alive. Agriculture has to face many complications like changing soil quality, water shortage, changing climate, etc. Due to the increasing in population demand for cereals and other crops for daily usage by the customers is also increased so there is a need for smarter implementation of irrigation and also develop farming methods that lessen human efforts and alter the basic eco systems this is less harmful to other creatures too. India is one of highest farming dependent county and generating countries all over the world. At the same time, India is facing the challenge of farmers committing suicide because of crop failure and liability. Most of the land in India is used for agriculture commitments. Still there exists several places that uses primitive methods for irrigation, fertilization etc. This leads to the degeneration in the crop yield and eventually less income for the farmers. This paper discusses the design and development of an IoT based module that assist farmers to improvise their methods of farming and also make the best use of their land for a better income. The main goal line of this IoT module is to sense agriculture parameter and advice farmers to properly grow and treat the crops. Also in this assignment we are going to implement a irrigation control i.e. motor control through android app. To avoid animal intrusion flasher are also going to implement in the field. This will reduce human efforts.

Key Words: WIFI, Database, LM-35, Xbee, Bluetooth, ESP 32.

1. INTRODUCTION

Nowadays mobile phones are fetching commonly used in daily scenario and among the beneficiaries of this are farmers. Farmers are using mobile phones in attaining their farming business and daily life. At the same time, Wireless Sensor Networks (WSNs) are also displaying a result in developed part of our world. WSNs potential in sensing various ecological condition, their affordability and applicability motivated to do research in this field. Therefore, the objective of project is to investigate and identify how the use of mobile phones with the support of WSN enable farmers where in their farm various sensors will be installed so that depending upon the sensed value we can control the devices in the filled. Advantage of this system will be it will provide monitoring and controlling of farm devices so that human effort will be reduce.

2. Implementation

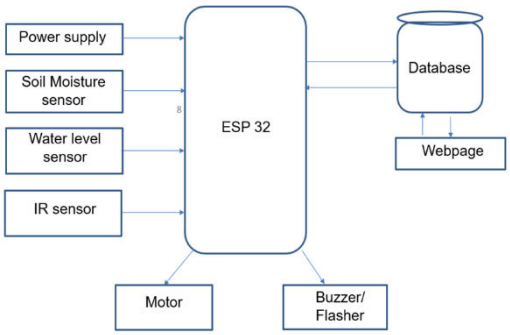

Fig -1: Block Diagram

Above figure 1 show implementation of required project. Firstly we have to sense value form physical sensor like here for sensing where AD8232 ECG sensor is used for sensing ECG, MAX 30100 pulse oximeter & heart rate sensor is used for sensing SP02 level in blood and heart rate.

A) ESP 32 Wroom

ESP 32 acts as heart of project where the sensed value will be given to ESP32 to monitor and display over the webpage. ESP32 has Wi-Fi support using which we can directly send the manipulated value to the cloud service such as ThingSpeak, Adafruit IO etc to show data in real-time. Using this we can generate the interesting graph of sensed value. It also support Bluetooth feature. There are many ESP32 modules available. Many of these boards have an integrated micro-USB connector that will simplify programming. Those sensed value from ESP32 will be send to Webpage by using ESP webserver supported by ESP32.

This sensed value will be send to ESP32 Wroom this will manipulate data and using AP mode of ESP 32 this sensed value will be send to database their data will be there for future use. Then this data will display on webpage created by html & CSS.

B) Sensors

In this project as we have to sense value of different circumstances of farming. For that IR Sensors ,DHT 11 Temperature and Humidity Sensor ,Soil Moisture Sensor are used.IR sensor is used to create a boundary around field if any object cross the boundary then buzzer gives alarm, Soil moisture sensor is used to sense moisture level in the field. This sense value is transmitted to ESP32 for further operation.

1) IR Sensor

IR sensor is an electronic device, that produces the light in order to sense some object of the environments. An IR sensor can measure the heat of an object as well as notices the motion. Ordinarily, in the infrared spectrum, all the objects emit some form of thermal radiation. These types of radiations are unseen

to our eyes, but infrared sensor can notice these radiations. There are different types of infrared transmitters available depending on their wavelengths, output power and response time. An IR sensor consists of an IR LED and an IR Photodiode, composed they are called as Photo Coupler or Opto-Coupler.

2) DHT11–Temperature and Humidity Sensor

The DHT11 is a commonly used to measure temperature and humidity sensor. The sensor comes with a committed NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. So if you are observing to measure in this range then this sensor might be the right choice for you.

3) Soil Moisture Sensor

Volume of water content in soil is measured by soil moisture sensor. Since the straight gravimetric measurement of free soil moisture requires extra work of removing, drying, and balancing of a sample, soil moisture sensors calculate the volumetric water content not directly but by using some other things of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a substitution for the dampness content. The relation between the dignified property and soil moisture must be adjusted and may vary depending on environmental issues such as soil type, temperature, or electric conductivity. Reflected microwave radiation is precious by the soil humidity and is used for remote detecting in hydrology and agriculture.

4) Webpage

The final display of web page shown in “figure 2” through this web page doctor can monitor the health condition of patient and can medicate him/her remotely. That’s the main goal of this project.

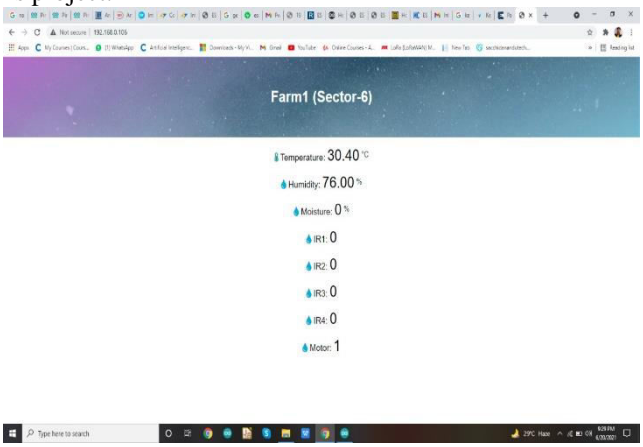

Fig. 2: Webpage

3. CONCLUSIONS

In this way by implementing proposed efforts required for farmer to monitor the farm may reduce if this system is implemented in farm field. While developing this project we come across new technology to complete the task like HTML,

FUTURE SCOPE

- As here in model soil moisture, & temperature observed but in future we can can be displayed on webpage to generate decorative graph in webpage.
- We can add a display sensed data on display
- We can also add feature so that it will be fully automation system.

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